

Amendment and Response

Applicant: Michael Bauer et al.

Serial No.: 10/565,259

Filed: October 17, 2006

Docket No.: 1431.145.101/FIN606PCT/US

Title: SUPPORT WITH SOLDER BALL ELEMENTS AND A METHOD FOR POPULATING SUBSTRATES WITH SOLDER BALLS

REMARKS

The following remarks are made in response to the Non-Final Office Action mailed August 12, 2009. Claims 26, 29 and 34 have been withdrawn from consideration. Claims 1-18 were previously cancelled. With this Response, claims 19-24 and 37 have been canceled. Claims 25, 27, 28, 30-33, 35 and 36 remain pending in the application and are presented for reconsideration and allowance.

Election/Restriction

Applicants affirm the election of Specie IIA as required in section 2 of the Office Action.

Claim Rejections under 35 U.S.C. § 102

Claims 19-25, 31, 36, and 37 were rejected under 35 U.S.C. 102(b) as allegedly being anticipated by Hotchkiss (US 6,239,013). Claims 19-24 and 37 have been canceled without prejudice. Applicants respectfully traverse the remaining rejections.

It is well accepted that, to anticipate a claim, the cited reference must disclose each claim element, and the elements must be arranged as required in the claim. MPEP 2131 (citing *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990)). Since Hotchkiss fails to disclose each element of the claims arranged as recited in the claims, it cannot anticipate claim 25 or any claims dependent thereon.

Claim 25 includes,

- an irradiating device with a source of radiation and apparatus for selectively irradiating the support to reduce the adhesion of the layer of adhesive for loosening solder ball elements at prescribed positions;
- a removal device for removing the loosened solder ball elements and leaving solder ball elements in an arrangement pattern for flip-chip contacts or ball contacts

The antecedent for *the loosened solder ball elements* recited in the second clause shown above clearly is the solder ball elements referred to in the immediately preceding clause. Thus, the

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removal device is for removing the solder ball elements that were selectively loosened by the irradiating device.

Claim 31 includes,

selectively irradiating the support to reduce the adhesion of the layer of adhesive and loosen solder ball elements at prescribed positions;
removing the loosened solder ball elements and leaving solder ball elements that are fixed on the support in an arrangement pattern for a semiconductor chip or for a semiconductor component;

As with claim 25, the method of claim 31 recites removing the solder balls that were loosened by the selective radiation.

Hotchkiss fails to disclose a system in which the irradiating device selectively irradiates the support to reduce the adhesion of the layer of adhesive for loosening solder ball elements at *prescribed* positions, as recited in claims 25 and 31. In the claimed system and method, only some of the solder ball elements that are attached to the layer of adhesive on the support are loosened by selectively irradiating the adhesive layer in the vicinity of the solder ball elements to be removed. The loosened solder balls are then removed.

In contrast, Hotchkiss teaches irradiating the entire support in column 5, lines 29 to 37 so that the adhesive sheet is removed from all of the solder particles. The Office Action fails to identify a disclosure in Hotchkiss of selectively irradiating the support so that only certain solder balls are loosened.

Hotchkiss further fails to disclose a removal device or removing the solder balls selectively loosened by irradiation. The Office Action identifies column 4, lines 60-67 of Hotchkiss as disclosing this element. The cited portion of Hotchkiss teaches using a gas stream or mechanical device to remove excess solder particles. There is no mention of the gas stream or other mechanical device removing solder particles loosened by selective irradiation. In fact, Hotchkiss discloses using removing excess solder particles before it teaches the use of radiation for removal of the adhesive sheet.

Since Hotchkiss fails to disclose each element of claims 25 and 31 arranged as recited in the claims, it cannot anticipate these claims, or any claims dependent thereon.

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Claims 25, 27, 31, and 35 were rejected under 35 U.S.C. 102(b) as allegedly being anticipated by Wachtler (US 6,071,801). Applicants respectfully traverse these rejections.

As noted above in the remarks concerning the Hotchkiss reference, claims 25 and 31 recite irradiating the support to loosen solder balls, then removing the loosened solder ball elements (loosened by prior selective irradiation). The Office Action first alleges that Wachtler discloses irradiating to loosen solder balls at column 5, lines 20-28. However, this portion and the following portions of Wachtler teach applying radiation before the solder particles are applied to the adhesive. The cited portion of Wachtler teaches, "In forming adhesive areas 30 ... portions of adhesive coating 22 are exposed to radiation." Wachtler at col. 5, ll.

Figure 6 of Wachtler is reproduced below.

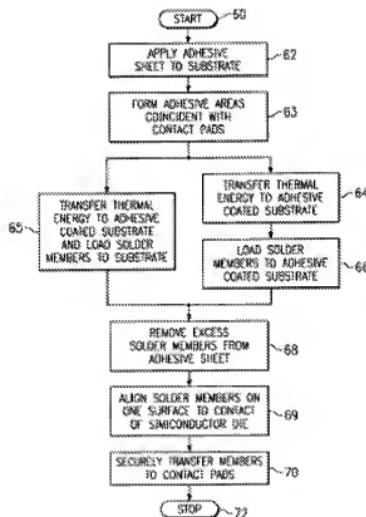


FIG. 6

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Adhesive areas are formed at block 63 of Wachtler Figure 6, which as noted above, includes exposing the adhesive to radiation. Then, *after* the adhesive areas are formed, solder members are loaded on the substrate as shown in Blocks 65 and 66. Thus, Wachtler does not disclose or even suggest selectively irradiating to loosen solder ball elements at prescribed positions, since in Wachtler, the radiation is applied prior to attaching the solder elements. Wachtler therefore also fails to disclose removing the loosened solder ball elements, since Wachtler fails to teach loosening the solder elements by irradiating.

Applicants therefore respectfully submit that Wachtler fails to anticipate claims 25, 27, 31 and 35.

Claim Rejections under 35 U.S.C. § 103

The remaining claims were rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over various combinations of references. The remaining claims all ultimately depend on either claim 25 or claim 31, which are allowable as set forth above. Claims 27, 28, 30, 32 and 33 are therefore allowable for at least the same reasons.

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CONCLUSION

In view of the above, Applicant respectfully submits that all of the pending claims are in form for allowance. Therefore, reconsideration and withdrawal of the rejections and allowance of the claims are respectfully requested.

No fees are required under 37 C.F.R. 1.16(h)(i). However, if such fees are required, the Patent Office is hereby authorized to charge Deposit Account No. 50-0471.

The Examiner is invited to contact the Applicant's representative at the below-listed telephone numbers to facilitate prosecution of this application.

Any inquiry regarding this Amendment and Response should be directed to Mark L. Gleason at Telephone No. (612) 767-2503, Facsimile No. (612) 573-2005. In addition, all correspondence should continue to be directed to the following address:

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Respectfully submitted,

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